



# The interuniversity PhD course in Industry 4.0 Politecnico di Bari – Università degli Studi di Bari Aldo Moro

<http://phdindustria40.poliba.it>

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*Full Professor in Automation*

*Department of Electrical and Information Engineering – Politecnico di Bari*

*Coordinator of the interuniversity PhD course in Industry 4.0 - Università degli Studi di Bari – PhD School of the Politecnico di Bari*

# Outline

- **General information**
- **Motivation and goals**
- **The industry 4.0 paradigm**
- **Research topics of the PhD program**
- **Academic board**
- **Network of collaborations and internationalization**
- **Course schedule**
- **Seminars and scientific events**
- **Teaching activity**
- **Advertising and communication**
- **Future outlooks**

## The PhD course in Industry 4.0

It is an interuniversity PhD course:

- Politecnico di Bari (Poliba)
- Università degli Studi di Bari “Aldo Moro” (Uniba)



Politecnico  
di Bari



UNIVERSITÀ  
DEGLI STUDI DI BARI  
ALDO MORO

It is newly established:

- first PhD course in Italy on "Industry 4.0"
- accredited by MUR in July 2020

involves several departments:

- **Proposing Department:**
  - Dipartimento di Ingegneria Elettrica e dell'Informazione (DEI) – Politecnico di Bari
- **Other departments involved:**
  - Politecnico di Bari:
    - Dipartimento di Ingegneria Meccanica, Matematica e Management (DMMM)
  - Università di Bari:
    - Dipartimento di Informatica, Dipartimento di Chimica, Dipartimento di Farmacia
  - Dipartimento Interateneo di Fisica (DIF)



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## Motivation

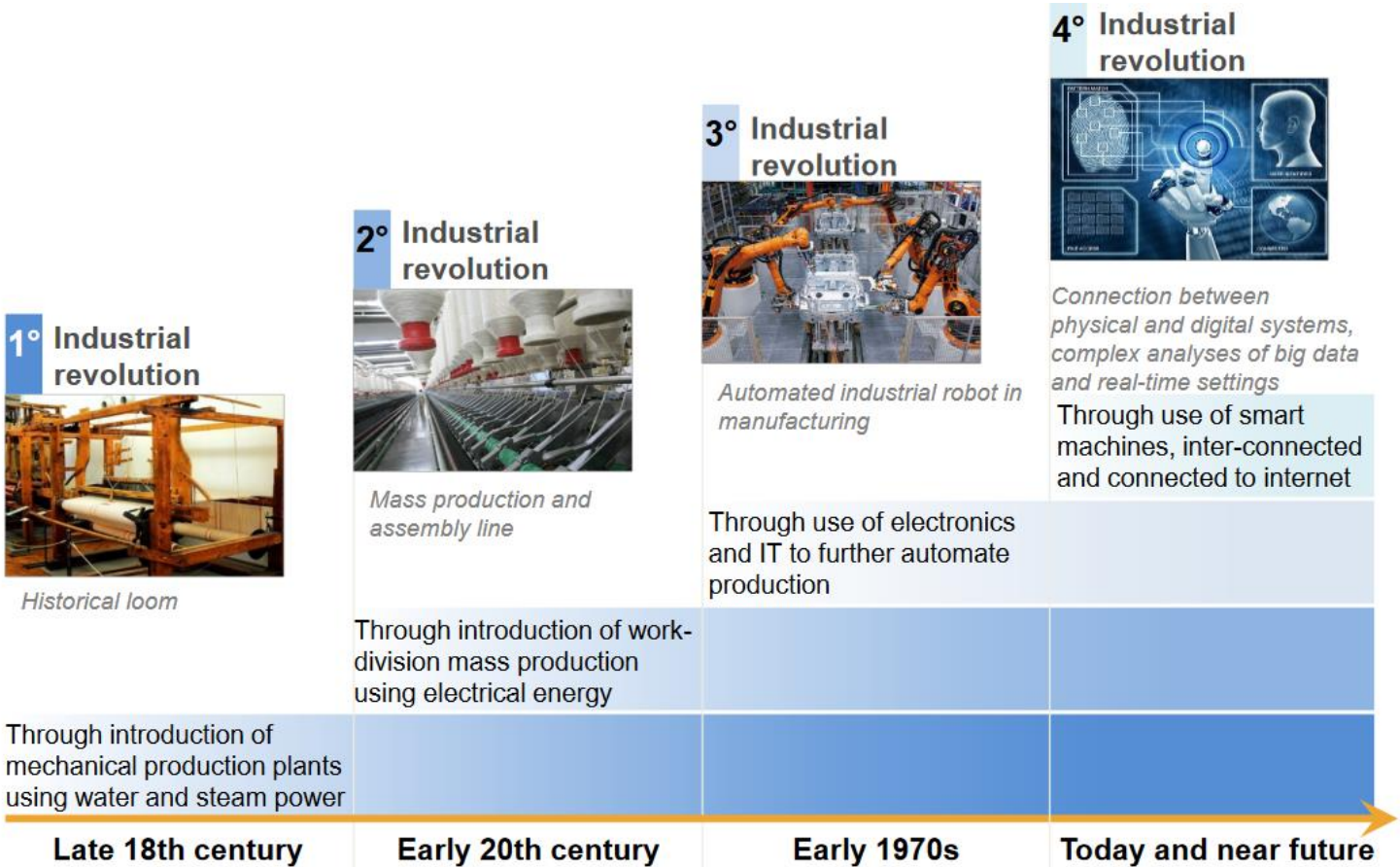
- the digital transformation taking place in industries increasingly requires high-level multidisciplinary skills, with cross-fertilization between:
  - basic sciences (ERC areas PE2-PE5)
  - computer science (ERC areas PE6)
  - information engineering (ERC areas PE7)
  - industrial engineering (ERC areas PE8)

## Goals

- pursuing high-level education/research initiatives on interdisciplinary technologies enabling the Industry 4.0 paradigm
- training researchers on contributing to innovation and digital transformation of Italian production areas:
  - regional context: aerospace, agri-food, automotive, biomedical, consumer electronics, energy, information technology, logistics/transport, mechanics/mechatronics, steel, textile, clothing/footwear sectors.

# The industry 4.0 paradigm

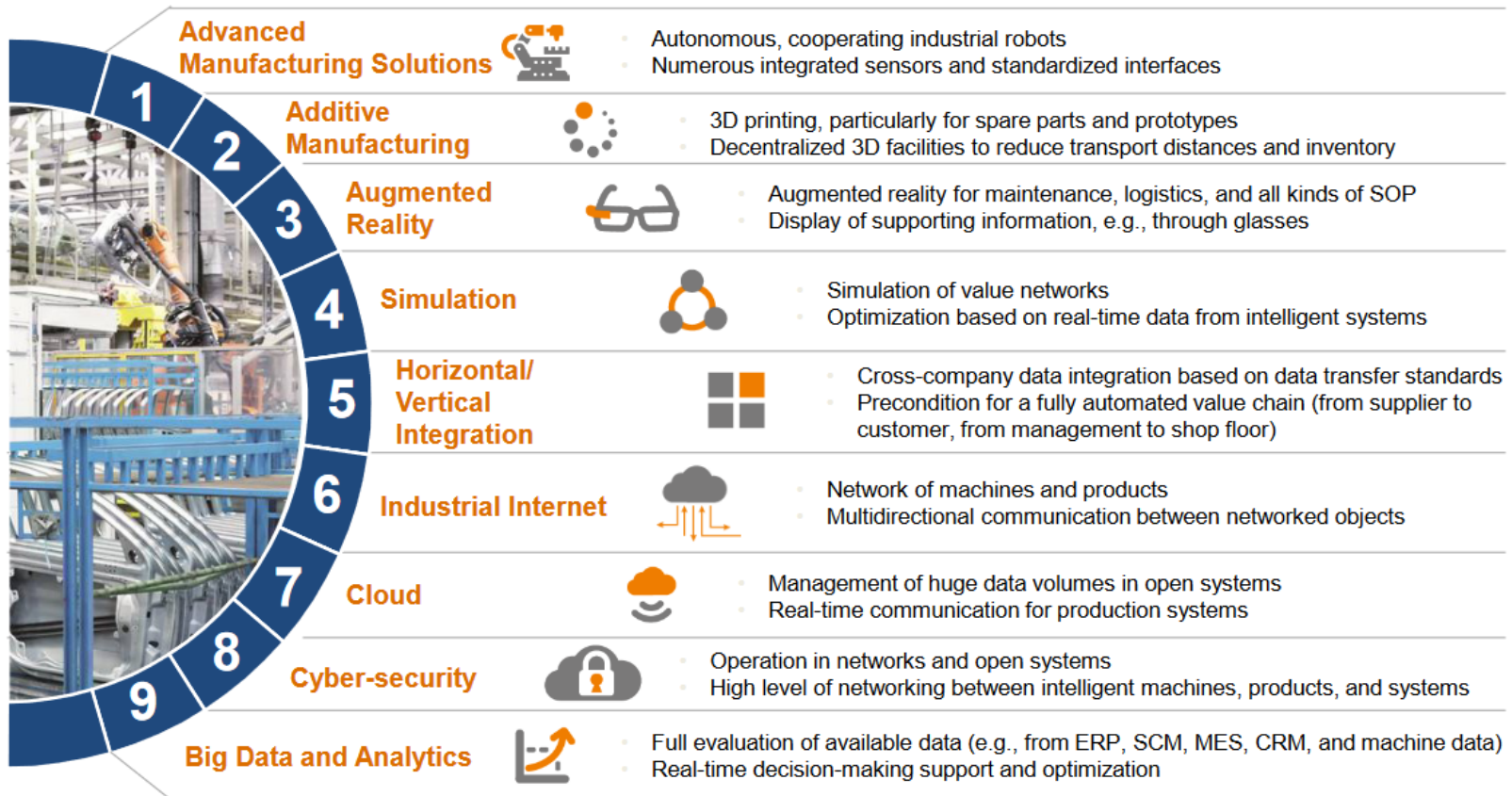
## Industry 4.0 - the fourth industrial revolution:



*"Industria 4.0" national plan*

# The industry 4.0 paradigm

## Industry 4.0 - enabling technologies:



*"Industria 4.0" national plan*

# The industry 4.0 paradigm

## Industry 4.0 and beyond:

- From traditional automation to cognitive automation (the operator, with augmented functionalities, becomes a factor of increased productivity for the factory)

- Collaborative automation (human-machine collaboration)

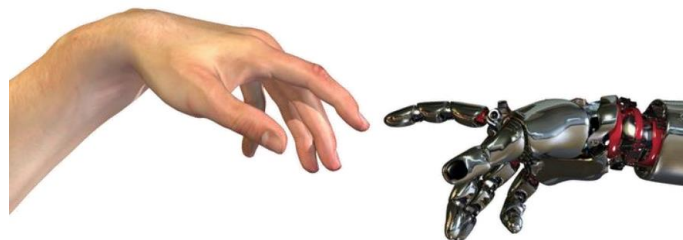


- Machine supervision activities

- Machine support activities



- towards industry 5.0 (collaborative industry, humans augmented thanks to cobot integration and connectivity)



## Intelligent vision systems for human monitoring during cobot interactions

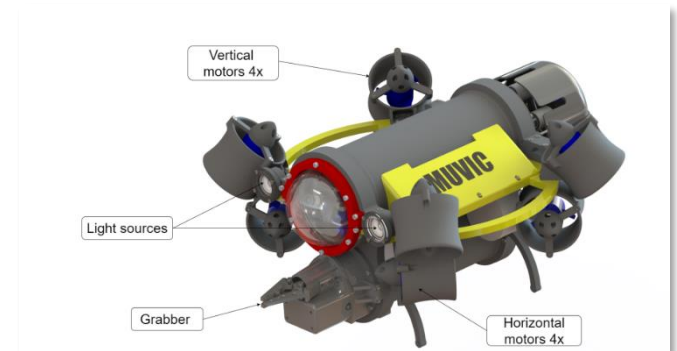
- EU H2020 Project “MindBot – Promoting good mental health in SMEs adopting cobots”
- [www.mindbot.eu](http://www.mindbot.eu)



## Decision and control techniques for collaborative robotics in Industry 4.0

- Safe, ergonomic, and efficient trajectory planning
- Collision avoidance and detection
- <http://dclab.poliba.it/>

## Advanced embedded systems for autonomous underwater robots control

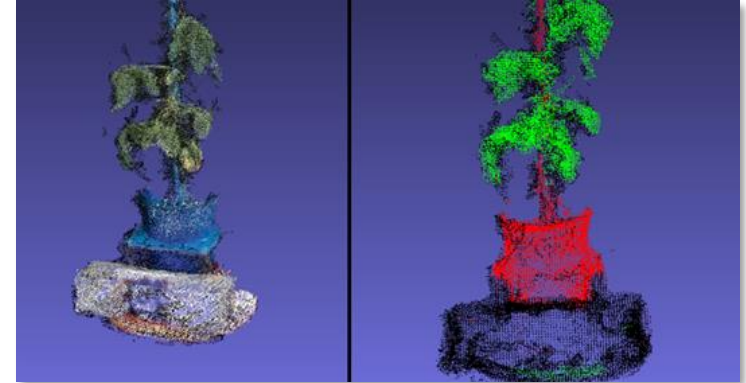




# Research topics of the PhD program

## Computer vision and Artificial Intelligence for high-throughput data analysis

- <https://www.stiima.cnr.it/>
- <https://www.alsia.it/>



## Artificial Intelligence for Marine Data Science (MDS)

- <https://www.stiima.cnr.it/>
- <https://www.uniba.it/ricerca/dipartimenti/informatica>



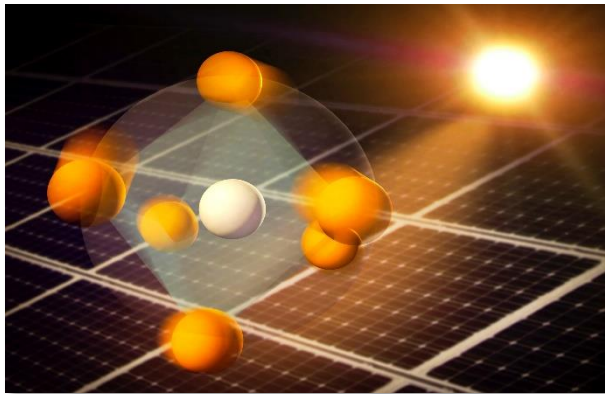
## ● Smart Education for Industry 4.0

- **Serious games**
- **Gamification**
- **Smart Learning Environments**
- [tell.di.uniba.it](http://tell.di.uniba.it)



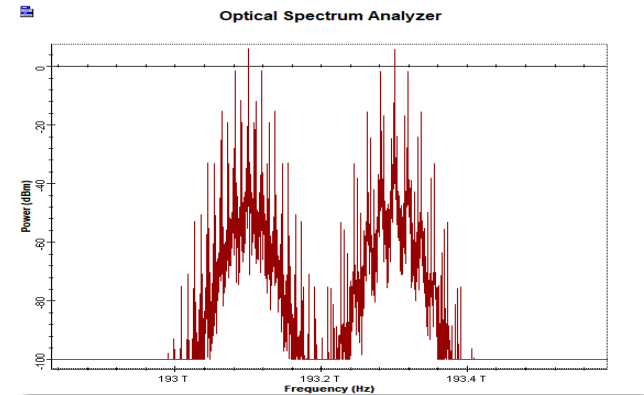
## Microwave/photonics for satellite telecommunication payloads: photonic RF frequency converter

- <https://www.npeg.poliba.it/>



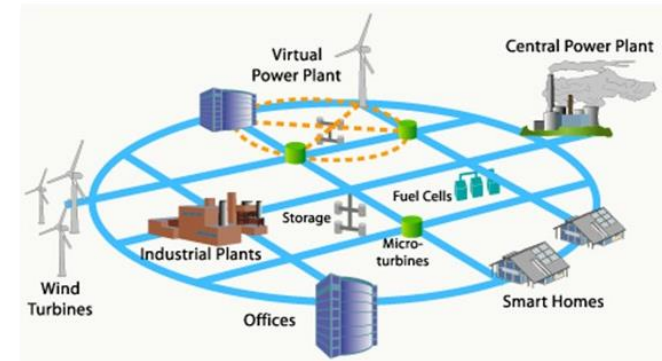
## Metal halide perovskite materials for energy conversion

- <https://www.uniba.it/ricerca/dipartimenti/chimica>



## Green and sustainable industrial development:

- industrial demand side management
- flexibility transition for industrial processes
- <http://dclab.poliba.it/>



## Extending Reality in Retailing: Re-shaping the future of User Experience

- <https://www.dmmm.poliba.it/vr3lab/>



## Augmented Reality Assisted Healthcare (ARAH)

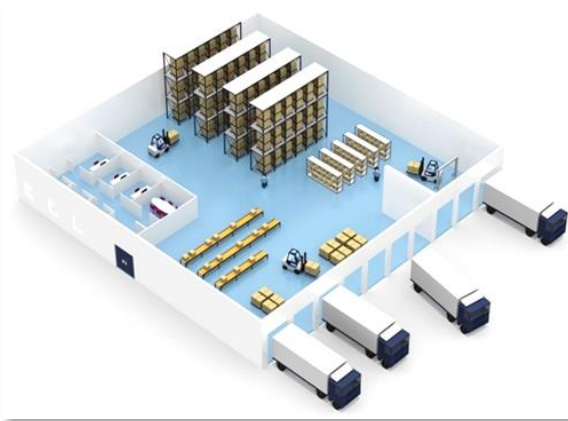
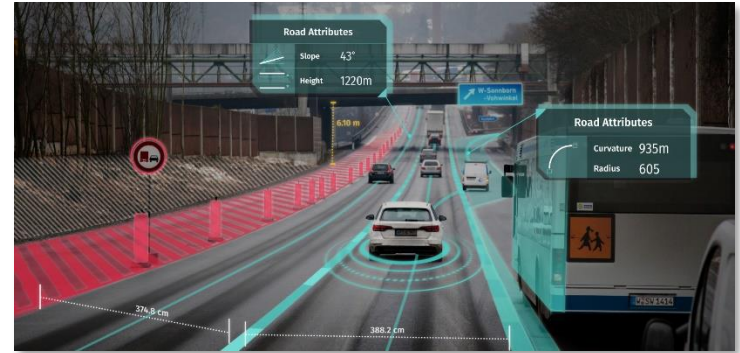
- <https://www.dmmm.poliba.it/vr3lab/>

## Virtual and augmented reality in complex manufacturing systems:

- ergonomics-oriented design
- modelling and simulation for performance and maintenance optimization
- <http://dclab.poliba.it/>
- <https://www.dmmm.poliba.it/vr3lab/>



## Path planning for motion sickness mitigation in autonomous vehicles

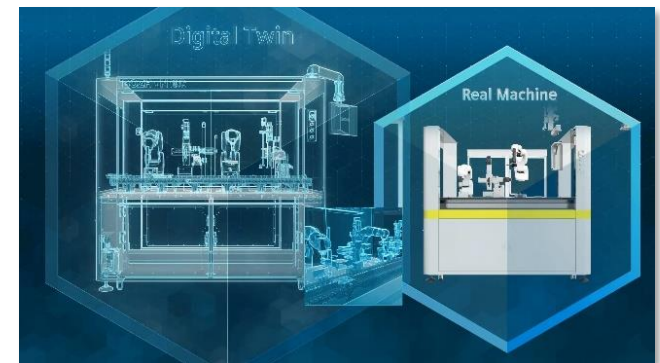


## Machine learning and optimization techniques for Logistics 4.0:

- automatic warehouses
- intelligent warehouse management systems
- <http://dclab.poliba.it/>

## Digital twin for controlling industrial systems:

- real-time performance optimization
- prognostics and health management
- <http://dclab.poliba.it/>



## Composition:

- **24 Scientific-Disciplinary Sectors, 4 Scientific-Disciplinary areas at CUN**

n.	SSD	Settori concorsuali interessati	Aree CUN-VQR interessate
1	CHIM/01	CHIMICA ANALITICA	03 - Scienze chimiche
2	CHIM/02	MODELLI E METODOLOGIE PER LE SCIENZE CHIMICHE	
3	CHIM/03	FONDAMENTI DELLE SCIENZE CHIMICHE E SISTEMI INORGANICI	
4	CHIM/06	CHIMICA ORGANICA	
	FIS/01	FISICA SPERIMENTALE	02 - Scienze fisiche
5	FIS/03	FISICA DELLA MATERIA	
6	FIS/07	FISICA APPLICATA	
7	INF/01	INFORMATICA	01 - Scienze matematiche e informatiche
8	ING-IND/08	MACCHINE E SISTEMI PER L'ENERGIA E AMBIENTE	09 - Ingegneria industriale e dell'informazione
9	ING-IND/13	MECCANICA APPLICATA ALLE MACCHINE	
10	ING-IND/15	PROGETTAZIONE INDUSTRIALE, COSTRUZIONI MECCANICHE E METALLURGIA	
11	ING-IND/16	TECNOLOGIE E SISTEMI DI LAVORAZIONE	
12	ING-IND/17	IMPIANTI INDUSTRIALI MECCANICI	
13	ING-IND/31	ELETTROTECNICA	
14	ING-IND/32	INGEGNERIA DELL'INGEGNERIA ELETTRICA	
15	ING-IND/33	INGEGNERIA DELL'INGEGNERIA ELETTRICA	
16	ING-IND/35	INGEGNERIA ECONOMICO-GESTIONALE	
17	ING-INF/01	ELETTRONICA	
18	ING-INF/02	CAMPI ELETTROMAGNETICI	
19	ING-INF/03	TELECOMUNICAZIONI	
20	ING-INF/04	AUTOMATICA	
21	ING-INF/05	SISTEMI DI ELABORAZIONE DELLE INFORMAZIONI	
22	ING-INF/06	BIOINGEGNERIA	
23	ING-INF/07	MISURE	

## Coordinator:

<b>DOTOLI Mariagrazia</b>	<b>Dip.to Ing. Elettrica e dell'Informazione</b>	<b>XXXVI-XXXVII</b>
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n.	Name	Affiliation	Cycles
1	AMOROSO Nicola	Uniba – Dip.to Farmacia	XXXVI-XXXVII
2	ANCONA Antonio	Uniba – Dip.to Fisica	XXXVII
3	CAPOZZI M. A. Marcella	Uniba – Dip.to Chimica	XXXVI-XXXVII
4	DE CAROLIS Berardina	Uniba – Dip.to Informatica	XXXVI-XXXVII
5	DIMAURO Giovanni	Uniba – Dip.to Informatica	XXXVI-XXXVII
6	FANIZZA Elisabetta	Uniba – Dip.to Chimica	XXXVI-XXXVII
7	LISTORTI Andrea	Uniba – Dip.to Chimica	XXXVI-XXXVII
8	NOVIELLI Nicole	Uniba – Dip.to Informatica	XXXVI
9	PATIMISCO Pietro	Uniba – Dip.to Interateneo Fisica	XXXVI-XXXVII
10	PICCA Rosaria Anna	Uniba – Dip.to Chimica	XXXVI-XXXVII
11	ROSSANO Veronica	Uniba – Dip.to Informatica	XXXVI-XXXVII
12	ANDRIA Gregorio	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI-XXXVII
13	ARDITO Carmelo Antonio	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVII
14	BOGGIA Gennaro	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI-XXXVII
15	BRUNO Sergio	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVII
16	CALO' Giovanna	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI-XXXVII
17	CAMPOREALE Sergio	Poliba – Dip.to Ing. Meccanica, Matematica e Management	XXXVI-XXXVII
18	DE LEONARDIS Francesco	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI-XXXVII
19	DELL'OLIO Francesco	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI-XXXVII
20	DI SCIASCIO Eugenio	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI
21	DICORATO Maria	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI-XXXVII
22	DIGIESI Salvatore	Poliba – Dip.to Ing. Meccanica, Matematica e Management	XXXVI-XXXVII
23	FIorentino Michele	Poliba – Dip.to Ing. Meccanica, Matematica e Management	XXXVI-XXXVII
24	GARAVELLI A. Claudio	Poliba – Dip.to Ing. Meccanica, Matematica e Management	XXXVI-XXXVII
25	LINO Paolo	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI-XXXVII
26	MASCOLO Saverio	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI-XXXVII
27	MENGA Nicola	Poliba – Dip.to Ing. Meccanica, Matematica e Management	XXXVI-XXXVII
28	PERRI Anna Gina	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVI
29	SPADAVECCHIA Maurizio	Poliba – Dip.to Ing. Elettrica e dell'Informazione	XXXVII
30	TRICARICO Luigi	Poliba – Dip.to Ing. Meccanica, Matematica e Management	XXXVI-XXXVII

## Members

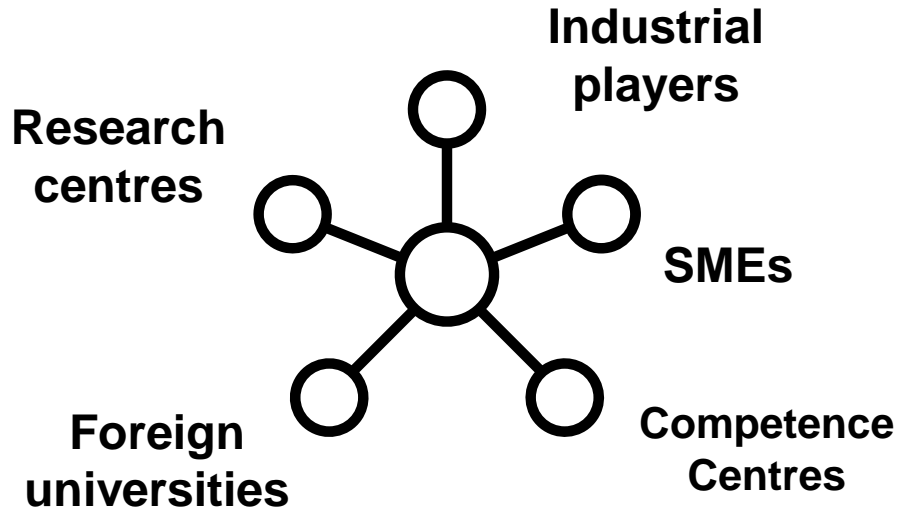
## Poliba + Uniba:

The PhD has an international scope, cooperating with numerous European and non-European universities

## Foreign members:

n.	Name	Affiliation	Cycles
1	CANTATORE Eugenio	TU Eindhoven, The Netherlands	XXXVI-XXXVII
2	DE SCHUTTER Bart	TU Delft, The Netherlands	XXXVI-XXXVII
3	DONG Lei	Shanxi University, China	XXXVI-XXXVII
4	HELLGE Cornelius	Fraunhofer Heinrich-Hertz-Institut Berlin, Germany	XXXVI-XXXVII
5	HUSER Thomas	Universitat Bielefeld, Germany	XXXVI-XXXVII
6	JIA Qing-Shan (Samuel)	Tsinghua University, China	XXXVI-XXXVII
7	LI Jingshan	Università del Wisconsin-Madison, USA	XXXVII
8	LUH Peter	University of Connecticut, USA	XXXVI-XXXVII
9	MAGLIETTA Rosaria	Consiglio Nazionale delle Ricerche, Italy	XXXVII
10	MALIZIA Alessio	University of Hertfordshire, UK	XXXVI
11	MARANI Roberto	Consiglio Nazionale delle Ricerche, Italy	XXXVII
12	ORDIERES MERE Joaquin Bienvenido	Universidad Politécnica de Madrid, Spain	XXXVI-XXXVII
13	OSTERBACKA Ronald Mattias	Åbo Akademi University, Finland	XXXVI-XXXVII
14	REVELIOTIS Spyros	Georgia Institute of Technology, USA	XXXVI-XXXVII
15	STORK André	Fraunhofer Institute for Computer Graphics, Germany	XXXVI-XXXVII
16	WANG Fei Yue	Chinese Academy of Sciences, Cina	XXXVI-XXXVII
17	WANG Michael Yu	Hong Kong University, China	XXXVI-XXXVII

# Network of collaborations and internationalization



## 8 national centres for industry 4.0:

Made (Milano)

Start 4.0 (Genova)

Bi-Rex (Bologna)

Artes 4.0 (Pisa)

Smact 4.0 (Triveneto)

CIM 4.0 (Torino)

Cyber 4.0 (Roma)

Meditech (Napoli and Bari).

## Collaboration with the Competence Center:

**MEDITECH**  
COMPETENCE CENTER

- Consortium established in the Campania and Puglia Regions for technology transfer in the Industry 4.0 area
- Participation in the Integra4.0 project, the so-called teaching factory of Meditech

**Integra4.0**

La "Teaching Factory 4.0" di MedITech



- **Collaborations with SMEs:**

- strong synergies between the proposing areas of the two Universities and the industrial research initiatives taking place in Puglia
- capitalization of the skills acquired by the two Universities within the technology transfer programmes

## Collaborations with large enterprises and research centers

- Research centers that are sponsors of Ph.D. scholarships:

- **STIIMA-CNR**



- Companies that are sponsors of Ph.D. scholarships:

- **Isotta Fraschini Motori SpA**
- **Masmec SpA**



*Isotta Fraschini Motori*  
a FINCANTIERI company

**MASMEC**

- Seminar activities on digitalization and industrial automation:

- **Siemens**
- **Omron**
- **Masmec SpA**

**SIEMENS**

**OMRON**

**MASMEC**



## Collaborations with Universities and Foreign Research Centers:

Name	Country	Description
ABO AKADEMI UNIVERSITY	Finland	Advanced functional materials
DELFT UNIVERSITY OF TECHNOLOGY	The Netherlands	Automation, robotics, simulation and optimization
FRAUNHOFER HEINRICH-HERTZ INSTITUT BERLIN	Germany	ICT systems for augmented reality and virtual reality platforms
SHANXI UNIVERSITY	China	Advanced sensors for industrial processes, environment and medical applications
UNIVERSITY OF CASTILLA - LA MANCHA	Spain	Software certification

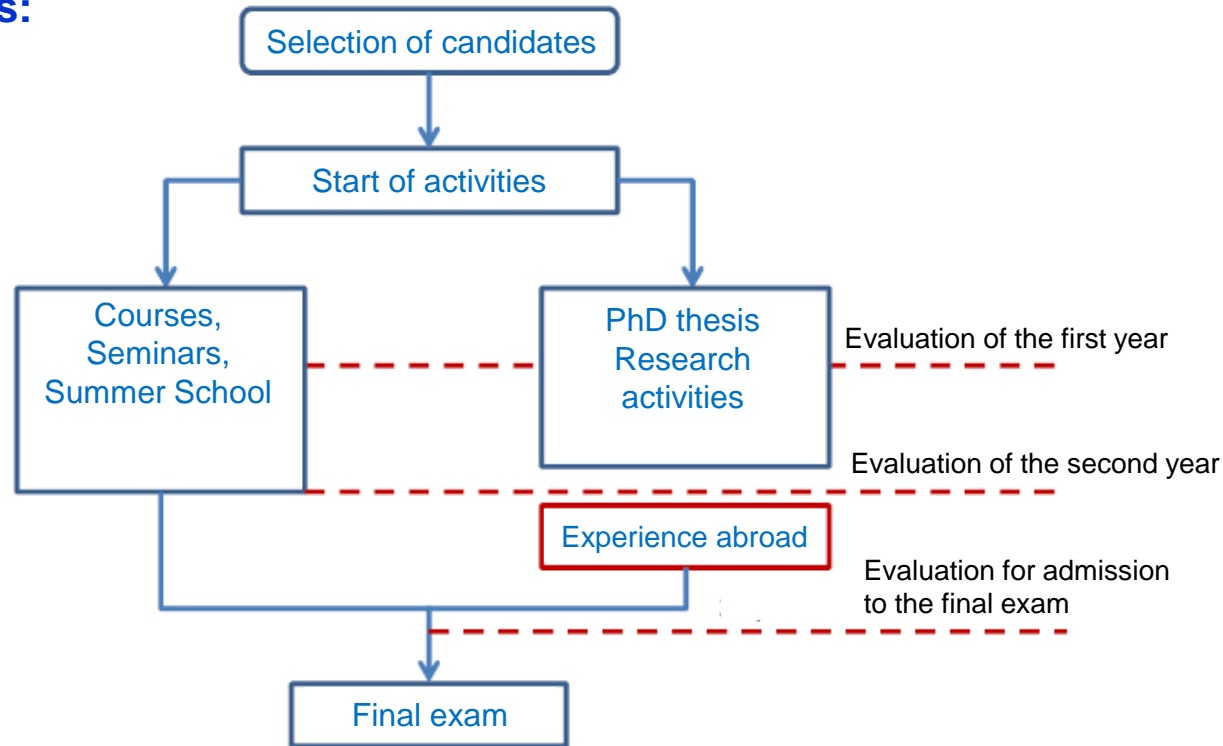
**15 members of the Academic Board with affiliation at universities and foreign research centers:**

- **TU Eindhoven (NL), TU Delft (NL), Shanxi University (CN), Fraunhofer Heinrich-Hertz-Institut Berlin (DE), Universitat Bielefeld (DE), Tsinghua University (CN), University of Wisconsin (USA), University of Connecticut (USA), University of Hertfordshire (UK), Universidad Politécnica de Madrid (ES), Åbo Akademi University (FI), Georgia Institute of Technology (USA), Fraunhofer Institute for Computer Graphics (DE), Hong Kong University (CN), Chinese Academy of Sciences (CN)**

# Course schedule

The course lasts 3 years-180 ECTS, including any period of study and research abroad and internships in public/ private institutions

general planning of activities:



**NOTE: MINIMUM REQUIREMENT FOR ADMISSION TO FINAL EXAM:**  
The PhD student is co-author of 1 (3) scientific articles in an international journal (in proceedings of international conferences ) indexed in Scopus or ISI/Web of Science databases.

**XXXVI cycle: starting Nov. 1st 2020, ending Oct. 31<sup>st</sup> 2023**

**38 applications to the selection**

**12 positions were assigned:**

- **3 positions with Poliba scholarship (1 reserved to foreign graduates)**
- **3 positions with Uniba scholarship**
- **1 position with scholarship funded by the Puglia Region**
- **2 positions with scholarship funded by local companies:**
  1. **Isotta Fraschini Motori SpA**
  2. **Masmec SpA**
- **3 positions without scholarship**

# Course schedule - XXXVI cycle

## XXXVI cycle

**12 places (6 women, 50%; 1 graduated abroad, 8%)**

	Name	Tutors	Scholarship	Research topic
1	DAMMACCO LUCILLA	Proff. Dotoli, Fiorentino, Ingg. Carli, Lazzizzera	Borsa Masmec	Realtà virtuale e aumentata per l'ottimizzazione delle prestazioni e della manutenzione delle linee di produzione
2	DE NICOLÒ FRANCESCO	Prof. Amoroso	Borsa Uniba	Big Data Analytics: from smart firms to smart consumers
3	DEMARINIS LOIOTILE ANNAMARIA	Proff. Bellotti, Amoroso	Senza borsa	Designing AI-based Technology Transfer Processes for the Healthcare 4.0 challenge
4	DI GIOIA MICHELE	Proff. Patimisco, Marzocca	Borsa Uniba	Development of compact electronics for optical sensors based on photoacoustic spectroscopy for the detection of gas traces
5	MARASCIUOLO FRANCESCA	Prof. Dicorato	Borsa Poliba	Integration of electric vehicles into microgrids and distribution grid
6	MINERVINI GIANLUCA	Proff. Fanizza, Panniello, Striccoli	Borsa Uniba	Materiali innovativi a base di Carbon Dot per applicazioni tecnologiche avanzate
7	PRICCI ALESSIO	Proff. Percoco, De Tullio, Tricarico	Borsa Regione	Analytical and Numerical Modeling of the Extrusion Based 3D Printing Process
8	PROIA SILVIA	Prof. Dotoli, Ing. Carli	Borsa Poliba Estero	Tecniche di decisione e controllo per sistemi robotici collaborativi per l'industria 4.0
9	RICCI MARINA	Prof. Fiorentino	Borsa Poliba	Extended Reality in Retail: Designing the Future of the Customer Experience
10	RODIO LUCA	Proff. D'Orazio, Calò, Dr. Schena	Senza borsa	Definizione e sviluppo prototipale di funzionalità digitali innovative in tecnologia ottico/fotonica per satelliti per telecomunicazioni
11	ROMEO LAURA	Prof. Perri, Ing. Marani	Senza borsa	Dispositivi e sistemi di visione per il monitoraggio del benessere degli operatori in uno spazio di lavoro condiviso con Cobot nell'Industria 4.0
12	SAPONARO GIANMARCO	Prof. Camporeale, Ing. Piscopo	Borsa Isotta Fraschini	Smart systems for Power Management

**XXXVII cycle: starting Nov. 1st 2021 (Jan 1<sup>st</sup> 2022 for GREEN/INNOVATION scholarships), ending Oct. 31<sup>st</sup> 2024 (Dec 31<sup>st</sup> 2024 for GREEN/INNOVATION scholarships)**

- **51** applications to the selection
- **11** applications to the “GREEN/INNOVATION” selection

**15** positions were assigned:

- **3** positions with Poliba scholarship (1 reserved to foreign graduates)
- **3** positions with Uniba scholarship
- **2** positions with scholarship funded by the Puglia Region
- **1** position with scholarship funded by research centers:
  1. **CNR-STIIMA**
- **3** positions with scholarship GREEN/INNOVATION
- **3** positions without scholarship

# Course schedule - XXXVII cycle

## XXXVII cycle

**16 places (6 women, 40%; 4 graduated abroad, 26%)**

	Name	Tutors	Scholarship	Research topic
1	BRESCIA WALTER	Prof. De Cicco	INNOVATION	Safe Reinforcement Learning for Decision and Control of Robots and Smart Embedded Devices
2	CIERRO CIRO	Proff. Carbonara, Dotoli	Senza Borsa	Modelli e indicatori di resilienza delle supply chain (Resiliency models and indicators for supply chains)
3	GRANDOLFO ADRIANA	Proff. Fanizza, Curri, Dott. Ingrosso	Borsa Poliba/Uniba	Nanostructured materials for functional textiles
4	HUSO INGRID	Proff. Boggia, Piro	Borsa Poliba/Uniba	Design and evaluation of novel network architectures and innovative communication protocols supporting cybersecurity services in the industry 4.0
5	MAIULLARI FRANCESCA	Prof. Monopoli	Borsa Poliba/Uniba	High Frequency Power Converters: Technical Problems Analysis and Possible Hardware and Software Solutions Development
6	MINE DASTAN	Prof. Fiorentino	INNOVATION	Innovative Augmented Reality Interaction Techniques For Health Care In Industry 4.0: Human-Centered Approach
7	PACIOLLA FRANCESCO	Proff. Patimisco, Amoroso	Borsa Poliba/Uniba	Spectroscopic measurement of volatile organic compounds as biomarkers for human breath analysis
8	PAPARELLA DAVIDE	Proff. Berardi, Camporeale	Senza Borsa	Smart control and management in energy communities
9	PAVONE ANTONIO	Proff. Percoco, Tricarico	Borsa Poliba/Uniba	Additive manufacturing for electrical actuation systems and sensing
10	RACANELLI VITO ANDREA	Prof. Mascolo	Borsa Regione	Autonomous Mobile Robots
11	RIAZ MUHAMMAD TANVEER	Proff. Boggia, Piro	Senza Borsa	Advanced Applications of IoT Networks in the Industrial Fields
12	RINI GABRIELE	Proff. Bottiglione, Sorniotti, Menga	Borsa Regione	Mitigation of motion sickness in automated vehicles
13	RUSSO FRANCESCA	Dott. Listorti, Colella, Prof. Fanizza	GREEN	Application of biopolymers to halide perovskite solar cells for flexible and robust devices
14	SOLIMANI FIROZEH	Dott. Renò, Dimauro	Borsa CNR	Innovative Methodologies in Agriculture for high-throughput Plant Phenomics using Computer Vision and Artificial Intelligence
15	SVISHCHEV NIKOLAI	Proff. Lino, Rybakov	Borsa Poliba Estero	Advanced embedded systems for autonomous robots control

<http://phdindustria40.poliba.it/ind/scientific-events/>

- **Workshops on Industry 4.0: Digital Twin – Siemens e Masmec.** 9-11 December 2020
- **Workshops on Industry 4.0: Omron Electronics.** 13-14 January 2021
- **IEEE SMC Italian Chapter Lecture Series on “Smart, PErvasive and Mobile Systems Engineering”.** Lecture on “Optimal control strategies to mitigate the COVID-19 outbreak in a multi-region scenario”. 26 February 2021
- **Technical Committee on Discrete Event Systems of the IEEE Control Systems Society.** Lecture on: “A Survey on Petri Nets Models for Logistics and Transportation Systems: A Focus on Freight Transport”. 20 May 2021
- **La meccatronica spiegata dalle aziende: presente e futuro della progettazione di machine.** 7 June 2021
- **TPM & Industry 4.0 in Fast-Moving Consumer Goods (FMCG) Manufacturing.** 7 December 2021
- **DEI Doctoral Research Seminars.** 2 February – 9 March 2022

<http://phdindustria40.poliba.it/ind/dei-doctoral-research-seminars/>



<http://phdindustria40.poliba.it/ind/educational-offer/>

- The didactic offer of the Industry 4.0 Doctoral Course coincides with that of the Doctoral School of Politecnico di Bari (SCUDO)  
<http://www.poliba.it/it/dottorato-di-ricerca-pagina/offerta-didattica>
- The following courses are specifically activated by the Industry 4.0 Doctoral Course

## Courses activated by the Industry4.0 PhD course for year 2021

	Professor	Course Title	SSD	CFU
1	Rosaria Anna Picca	Advanced Materials for Sensing Technologies	CHIM/01	1
2	Nicola Amoroso	Complex Networks: Big Data modelling and Learning	FIS/07	2
3	Francesco Dell'Olio	Flexible and Stretchable Electronics	ING-INF/01	2
4	Andrea Listorti	Innovative Materials for Energy Conversion Technologies	CHIM/03	1
5	Giovanna Calò	Physical Layer Security for wireless communication	ING-INF/02	2
6	Giovanni Magno	Photonics for Industry 4.0	ING-INF/02	2
7	Veronica Rossano	Smart Education for Industry 4.0	INF/01	2

# Teaching activities

## Courses to be activated by the Industry4.0 PhD for years 2022-24

	Proposing Professor	Course Title	SSD	CFU
1	Roberto Marani	Artificial intelligence for quality control with active infrared thermography	ING-IND/14	2
2	Agostino Mangini	Industry 4.0: Optimization, Control and Security	ING-INF/04	2
3	Giovanna Calò	Physical layer security	ING-INF/02	2
4	Tiziano Politi	Numerical Methods for Big Data	MAT/08	2
5	Giovanni Dimauro	Environmental data analysis	INF/01	2
6	Michele Fiorentino	Xtended Realities for Industry 4.0	ING-IND/15	2
7	Giuseppe Piro	Emerging methodologies and technologies for Cyber Security	ING-INF/03	2
8	Mariagrazia Dotoli	Applications of MATLAB	ING-INF/04	2
9	Alfredo Grieco	Fundamentals of Industrial Internet of Things	ING-INF/03	2
10	Giuseppe Coviello	Embedded system design for Industry 4.0	ING-INF/01	2
11	Antonella D'Orazio	Photonics for Industry 4.0	ING-INF/02	2
12	Vitoantonio Bevilacqua	Electronic, Information and Industrial Bioengineering	ING-INF/06	2
13	Vito Walter Anelli	Machine Learning	ING-INF/05	2
14	Gianluca Percoco	Multidisciplinary Research Applications of Extrusion Based 3D Printing	ING-IND/16	2
15	Maria Annunziata Capozzi	Multifunctional organic materials for optics and optoelectronics	CHIM/06	1
16	Elisabetta Fanizza	Advanced nanomaterials: properties and applications	CHIM/02	1
17	Francesco dell'Olio	Flexible and Stretchable Electronics	ING-INF/01	2
18	Tommaso Di Noia e Antonio Messeni Petruzzelli	Human-centered design in AI	ING-INF/05, ING-IND/35	2
19	Nicola Amoroso	Complex Networks: Big Data modelling and learning	FIS/07	2
20	Antonio Ancona	Principles of lasers and their applications in materials processing	FIS/03	2

## They say about us...

### ISTRUZIONE

La pubblicazione del bando di concorso è prevista per settembre

● Il Politecnico di Bari raddoppia i dottorati di ricerca. Ai 4 corsi attivi presso i suoi Dipartimenti se ne aggiungeranno, a novembre, altri quattro. La pubblicazione del bando di concorso è attesa presumibilmente per il prossimo settembre.

I corsi attuali sono: "Rischio e Sviluppo Ambientale, Territoriale ed Edilizio"; Ingegneria Mec-

*(La Gazzetta di Bari, 30/05/2020)*

### Università

## Il Politecnico raddoppia: altri quattro dottorati

**BARI** Quattro nuovi assi nella manica sul fronte dell'alta formazione post laurea e della ricerca per Politecnico, guidato dal rettore Francesco Cupertino (foto) e Università Aldo Moro di Bari. Industria 4.0, Ingegneria e scienze aerospaziali, Archeologia globale dei paesaggi e Gestione sostenibile del territorio sono, infatti, i nuovi corsi interateneo che parti-

*(Corriere del mezzogiorno, 31/05/2020)*



## Al Politecnico 4 nuovi dottorati di ricerca su industria, aerospazio e territorio

Il rettore Cupertino: investiamo sulle competenze del Paese. Collaborazione con l'Ateneo

*(La Repubblica, 31/07/2020)*

ranno da novembre. Si aggiungono ai quattro dottorati di ricerca già attivi nei dipartimenti del Politecnico che, così, raddoppia i gioielli di famiglia. I primi due dottorati avranno sede amministrativa-gestionale al Politecnico, gli altri nell'Ateneo barese. Ma, soprattutto e in particolare per quanto riguarda Industria 4.0 e Ingegneria in scienze spaziali puntano a istituire un percorso triennale di studio e ricerca in stretta connessione con le aziende del settore. Il bando di concorso è atteso per il prossimo settembre. Le borse di studio rientrano nei finanziamenti previsti dalla Regione Puglia che, con la misura «Dottorato XXXVI Ciclo», ha stanziato complessivamente oltre 5 milioni di euro.

*(La Repubblica, 07/07/2020)*

## Politecnico e Masmec un'intesa che vale "Qui si gioca il futuro"

Un dottorato di ricerca "Industria 4.0" finanziato dall'azienda di Modugno. Sarà dedicato alla realtà virtuale e aumentata. Vinci: "Puntiamo sul talento"

Il Politecnico di Bari continua a dialogare con le aziende del territorio. E ora stringe un accordo con Masmec, che finanzia il nuovo dottorato interateneo di ricerca "Industria 4.0". Sarà dedicato alla realtà virtuale e aumentata, da impiegare nelle attività di manutenzione e assistenza sugli impianti produttivi. «Il nuovo dottorato – spiega la sua coordinatrice Mariagrazia Dotoli, docente ordinaria di Automatica al Politecnico – è incentrato sul paradigma dell'industria 4.0, e nello specifico sulla convergenza e integrazione tra tecnologie di produzione e dell'informazione».



▲ La visita in azienda. Il rettore del Politecnico Francesco Cupertino nella sede della Masmec a Modugno davanti a un macchinario

## Isotta Fraschini, il rilancio passa anche dal Politecnico

Un programma di ricerca per il rilancio della **Isotta Fraschini** motori. L'azienda del gruppo **Financiel**, con sede a Bari, svilupperà il progetto "I future" con il Politecnico di Bari grazie a un accordo triennale e rinnovabile. «Il progetto – spiega il presidente di **Isotta Fraschini** Motori, Sergio Razeto – è un percorso impegnativo di rinnovamento della nostra azienda, che guarda all'eccellenza e all'innovazione. Sono soddisfatto di avere come partner scientifico il Politecnico di Bari per questa operazione di rilancio».



# Future outlooks

## ● Teaching

- Establishing Double Degrees with other PhD courses at foreign universities
- Extending the course catalogue of the Poliba PhD School

## ● Research

- Expanding the PhD research results towards the Industry 5.0 paradigm
- Monitoring of PhD students' results (publications/patents/software, etc.)

## ● Internationalization

- Increasing collaborations with foreign universities

## ● Technology Transfer

- Monitoring of placement of future PhDs
- Consolidating collaborations with companies

## ● Dissemination

- Promoting communication activities (e.g., course website, newsletter)
- Participating in workshops and fairs



## Thank you for your attention!



Politecnico  
di Bari



UNIVERSITÀ  
DEGLI STUDI DI BARI  
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*Department of Electrical and Information Engineering – Politecnico di Bari*

*Coordinator of the interuniversity PhD course with Università degli Studi di Bari  
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<http://phdindustria40.poliba.it>